Federal Democratic Republic of Ethiopia

EDICT OF GOVERNMENT

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ET 983 (2004) (English): Icing Sugar - Specification

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ETHIOPIAN
STANDARD

ES 983:2004

(Reaffirmed: 2012)

First edition

Icing sugar — Specification

ICS: 67.180.10

Published by Ethiopian Standards Agency

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Foreword

This Ethiopian Standard has been prepared under the direction of the Technical Committee for Sugar and Sugar Products (TC 22) and published by the Ethiopian Standards Agency (ESA).

The standard is a reaffirmation for reprint of the Ethiopian Standard ES 983:2004, Icing sugar -Specification with some editorial changes without altering the technical contents in the former text.

Icing Sugar- Specification

1 Scope

This Ethiopian Standard specifies the requirements and the methods of sampling and test for icing sugar.

2 Normative references

The following Ethiopian Standard contains provisions, which through reference to this text constitute provisions of this Ethiopian Standard. At the time of publication the editions indicated were valid. All standards are subject to revision, and possibility of applying the most recent editions of the Ethiopian Standard indicated below. Registers of currently valid standards are maintained in the Ethiopian Standards Agency.

ES 359, *General standard for the labeling of pre-packaged food*.

ES 985, *White sugar -specification*.

ES 988, *Determination of Arsenic in food*.

ES 989, *Determination of Lead in food*.

3 Definition

For the purpose of this Ethiopian Standard the following definitions shall apply.

3.1
icing sugar
Shall mean finely pulverised white sugar with or without the addition of an anti caking agent.

4 Requirements

4.1 General

4.1.1 Icing sugar shall be pulverized vacuum pan or refined sugar in the form of white powder free from dust or impurities or any other extraneous matter.

4.1.2 Icing sugar shall be processed from refined white sugar conforming to ES 985 specification for white sugar.

4.1.3 Particle size: - Not more than 2 percent of the material shall remain on a sieve of normal aperture size of 150 micron and not less than 75 percent shall pass through 75 micron sieve when tested in accordance with annex A.

4.1.4 Icing sugar shall comply with the requirements given in the following table.

Table 1 — Requirements for icing sugar

No.	Characteristics	Requirements	Test methods
1	Moisture, % by mass max.	0.10	ES 985 annex A
2	Polarization volume 0_Z min.	99.70	ES 985 annex B
3	Reducing sugars, % by mass max.	0.04	ES 985 annex C
4	Starch (moisture free), % by mass max.	5.0	Annex B
5	Color in ICUMSA units, max.	60.0	ES 985 annex D
6	Sulphur dioxide mg/kg max.	20.0	ES 985 annex E
7	Conductivity Ash, % by mass max.	0.04	ES 985 annex F

4.1.5 Icing sugar shall comply with requirements of heavy metals limits given in the following table.

Table 2 — heavy metals requirements for icing sugar

No.	Characteristics	Requirements	Test methods
1	Arsenic (As) mg/kg max.	1.0	ES 988
2	Copper (Cu) mg/kg max.	2.0	ES 985 annex G
3	Lead (Pb) mg/kg max.	0.50	ES 989

4.1.6 Icing sugar shall comply with microbiological requirements prescribed in ES 985 specification for White sugar

4.1.7 Hygienic conditions of icing sugar shall be done in accordance with ES 985 specification for white sugar

5 Packing and labeling

5.1 Icing sugar shall be packed in clean and sound materials that will afford it adequate protection during storage transportation distribution and use.

5.2 Labeling

5.2.1 Labeling of icing sugar shall be done in accordance with ES 359 general standard for labeling of prepacked foods and shall include the following information.

i) Name of the product;

ii) Name and address of the manufacturer;

iii) Batch or code number;

iv) Date of manufacture;

v) Net mass of the content.

5.2.2 Each bag shall have a net mass of 5,10 and 25 kg

6 Storage

6.1 Storage of icing sugar shall be done in accordance with ES 985 specification for white sugar.

7 Transportation

7.1 Transportation of icing sugar shall be done in accordance with ES 985 specification for white sugar.

8 Sampling

Sampling of icing sugar shall be done in accodance with ES 985 specification for white sugar

Annex A
(normative)

A. Determination of particle size

A.1 Apparatus

A.1.1 150 micron sieve

A.1.2 75 micron sieve

A.1.3 Sieve lid

A.1.4 Receiver (base pan)

A.1.5 mechanical sieve shaker

A.1.6 Analytical balance

A.2 Producer

A.2.1 Accurately weigh 100 gram of sample.

A.2.2 Assemble the sieves in descending order aperture size including the base pan (receiver) and lid.

A.2.3 Transfer the sample to the upper most sieve.

A.2.4 Place the stack of sieves onto mechanical shaker and shake for 10 minutes.

A.2.5 Remove the sieves from the shaker and weigh the sugar retained on each sieve and the base pan.

A.2.6 Determine the mass of the portion retained on 150 -micron sieve and that of the portion passing the 75 -micron sieve.—

Calculation: Percent retained on 150 micron= $\frac{Mx100}{W}$

Percent retained on 75 micron =$\frac{M+M1x100}{W}$

Where,

M= mass retained on150micron

M1= mass retained on 75 micron

W= mass of sample taken for test

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Annex B

(normative)

Determination of starch

B.1 Apparatus

B.1.1 Analytical balance

B.1 .2 Burette 50ml

B.1.3 Conical flask 300ml

B.1.4 Volumetric flask

B.1.5 Hot plate

B.1.6 Pipettes 25, 10, 5ml

B.1.7 Watch glass

B.1.8 Water bath

B.1.9 Timer – to indicate minutes and seconds

B.2 Reagents

B.2.1 Fehling's solution prepared by mixing immediately before use equal volumes of solution A and solution B.

B.2.2 solution A – Dissolve 34.639 gram of copper sulphate ($CuSO_4.5H_2O$) in water add 0.5 ml concentrated sulphuric acid of specific gravity 1.84 and dilute to 500ml in a volumetri c flask. Filter the solution through inert filter medium e.g. porous ceramic or sintered glass.

B.2.3 Solution B – dissolve 174g of potassium sodium tartarate ($KNaC_4O_6.4H_2O$) and 50 gram sodium hydroxide, in water, dilute to 500 ml in a volumetric flask and allow the solution to stand for two days. Filter the solution through an inert filter medium e.g. porous ceramic or sintered glass.

B.2.4 Mixed Fenling's solution Mix together equal volumes of solution A and B by pouring solution A into solution B whilst stirring with glass rod filter if necessary and store in suitable stoppered container.

B.2.5 Mthylene blue indicator Dissolve 0.2g of methylene blue in water and dilute to 100 ml.

B.2.6 Concentrated hydrochloric acid sp. Gr. 1.16.

B.2.7 Sodium hydroxide 1mol/L.

B.2.8 Phenolphthalein solution. Dissolve 1g of phenolphthalein in 60 ml of denatured alcohol and make up to 100 ml with water.

B.3 Procedure

B.3.1 Preparation of the test solution

B.3.1.1 weigh accurately about 2.5g of the sample.

B.3.1.2 Transfer the sample to a conical flask with about 80 ml of water.

B.3.1.3 Add 10 ml of concentrated hydrochloric acid.

B.3.1.4 Heat the flask for one hour in a briskly boiling water bath.

B.3.1.5 Cool and neutralize with sodium hydroxide by adding few drops of phenolphthalein solution.

B.3.1.6 Transfer the solution to 500ml volumetric flask and make up the volume to the mark.

B.3.2 **Estimation of reducing sugars**

B.3.2.1 Pour the prepared test solution into 50ml burette.

B.3.2.2 Pipette 25ml mixed Fehling's solution into 300ml conical flask.

B.3.2.3 Run in from the burette 15 ml of the prepared solution.

B.3.2.4 Heat the contents of the flask on hot plate and boil after the liquid has been boiling for about 15 seconds, it will be possible to judge if almost all the copper is reduced by the bright red colour imparted to the boiling liquid by the suspended cuprous oxide.

B.3.2.5 When it is judged that nearly all the copper is reduced, add one millilitre of methylene blue indicator solution continue boiling the contents of the flask for one to two minutes from the commencement of ebullition. .

B.3.2.6 Then add the prepared solution form the burette in small quantities one millilitre or less at a time.

B.3.2.7 Allow the liquid to boil for about 10 seconds between successive additions, till the blue colour of the indicator just disappears. Note the reading of the burette and calculate the volume of the prepared solution used up in titration.

B.4 Calculation

B.4.1 Record from column 3 of table 3 the amount of reducing sugar percent in 100ml of the test solution corresponding to the titre value.

$$\text{Starch(Moisture free), percent} = \left[\frac{SM}{1000} - \frac{WR}{100} - \frac{WS}{95}\right]\frac{90}{W}$$

Where

M amount of reducing sugars present in 100ml of prepared solution corresponding the titre;

W mass in gram of the sample taken for the test;

R percent reducing sugars by mass as determined in ES 985annex C.; and

S percent of sucrose by mass as determined in annex C

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Table III invert sugar factors for 25ml of Fehling's solution

Titre ml	Invert sugar Factor*	Reducing sugars (As anhydrous Dextrose) content per 100ml of solution mg
15	120.2	801
16	120.2	751
17	120.2	707
18	120.2	668
19	120.3	638
20	120.3	601.5
21	120.3	572.9
22	120.4	547.3
23	120.4	523.6
24	120.5	501.9
25	120.5	482.0
26	120.6	463.7
27	120.6	446.8
28	120.7	431.1
29	120.7	416.4
30	120.8	402.7
31	120.8	389.7
32	120.8	377.6
33	120.9	366.3
34	120.9	355.6
35	121.0	345.6
36	121.0	336.3
37	121.1	327.4
38	121.2	318.8
39	121.2	310.7
40	121.2	303.1
41	120.3	295.9
42	120.4	289.0
43	120.4	282.4
44	120.5	276.1
45	120.6	270.1
46	120.6	264.3
47	120.6	258.8
48	120.7	253.5
49	120.7	248.4
50	120.8	243.6

* Milligrams of anhydrous dextrose corresponding to 25ml of Fehling's solution.

Annex C

(normative)

Determination of Sucrose

C.1 Apparatus

C.1.1 Analytical balance

C.1.2 Water bath

C.1.3 Watch glass

C.1.4 Volumetric flask

C.1.5 Filter paper whatman No. 40 or equivalent

C.1.6 Baker 150ml

C.1.7 Timer – to indicate minutes and seconds

C.1.8 Pipettes 25, 10, 5ml

C.1.9 Conical flask 300ml

C.1.10 Burette 50ml

C.1.11 Hot plate

C.2 Reagents

C.2.1 The same as those given under B.2

C.3 Procedure

C.3.1 Preparation of test solution. Weigh accurately about 5g of the sample in a watch glass.

C.3.2 Transfer the sample quantitatively into a 150ml beaker, add about 50ml of water.

C.3.3 Warm the mixture in a water bath at 50 to 60 ^{0}C for about 5 minutes to dissolve the sucrose content of the sample.

C.3.4 Cool and filter through a whatman filter paper No. 40 or equivalent.

C.2.5 collect the filtrate carefully in a 100ml volumetric flask.

C.2.6 Wash the beaker and the insoluble residue of starch in the filter paper carefully with water. Make up the volume of the filtrate to 100ml.

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C.3.7 Inversion – Take 10ml of this solution in a conical flask and add 1.5ml of concentrated hydrochloric acid and about 10ml of water.

C.3.8 Heat the flask at 60 to 70^0C for 10 minutes in a water-bath.

C.3.9 Cool immediately and transfer quantitatively the inverted solution to a volumetric flask and make up the volume to 100 ml.

C.3.10 Estimate the reducing sugars in the inverted solution as in ES 985 annex C

C.3.11 Calculation

Refer column 3 of table III for the amount of reducing sugar present in 100ml of the test solution corresponding to the titre value and calculate the sucrose content as follows.

$$Sucrose\text{, }percent\ by\ mass = \frac{0.95}{W}(Q - WR)$$

Where

Q the value of reducing sugar of column 3 of table III corresponding to the titre volume;

W mass in gram of the sample taken for the test; and

R reducing sugar, percent by mass as determined in ES 985: annex C

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Ethiopian Standards Agency

Organization and Objectives

The Ethiopian Standards Agency (ESA) is the national standards body of Ethiopia established in 2010 based on regulation No. 193/2010.ESA is established due to the restructuring of Quality and Standards Authority of Ethiopia (QSAE) which was established in 1970.

ESA's objectives are:-

- Develop Ethiopian standards and establish a system that enable to check weather goods and services are in compliance with the required standards,
- Facilitate the country's technology transfer through the use of standards,
- Develop national standards for local products and services so as to make them competitive in the international market.

Ethiopian Standards

The Ethiopian Standards are developed by national technical committees which are composed of different stakeholders consisting of educational Institutions, research institutes, government organizations, certification, inspection, and testing organizations, regulatory bodies, consumer association etc. The requirements and/ or recommendations contained in Ethiopian Standards are consensus based that reflects the interest of the TC representatives and also of comments received from the public and other sources. Ethiopian Standards are approved by the National Standardization Council and are kept under continuous review after publication and updated regularly to take account of latest scientific and technological changes.
Orders for all Ethiopian Standards, International Standard and ASTM standards, including electronic versions, should be addressed to the Documentation and Publication Team at the Head office and Branch (Liaisons) offices. A catalogue of Ethiopian Standards is also available freely and can be accessed in from our website.

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International Involvement
ESA, representing Ethiopia, is a member of the International Organization for Standardization (ISO), and Codex Alimentarius Commission (CODEX). It also maintains close working relations with the international Electro-technical Commission (IEC) and American Society for Testing and Materials (ASTM).It is a founding member of the African Regional Organization for standardization (ARSO).

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